

Electrospinning of Silicon and Sulfur Nanofibers for Lithium Ion Battery Applications

Kevin J. Rhodes¹, Jonathan Sulek², Philip Gase³, Jim Adams¹

¹ Ford Motor Company – Energy Storage and Materials Research Department, Dearborn, MI 48121

² Oakland University, Rochester, Michigan 48309

³ Purdue University, West Lafayette, IN 47907

Electrospinning is a process capable of easily forming highly porous mats of nanofibers which offer interesting opportunities for the development of advanced electrodes and separators for lithium ion batteries (LIB). Specifically, polyacrylonitrile fibers may be electrospun then subsequently stabilized and carbonized to form porous conductive carbon networks. When embedded with active materials this process may be used to produce electrode for use in LIB. The current work has focused on the development of this technique for the preparation of high capacity anodes and cathodes with high rate cycling capabilities. In this pursuit, the use of silicon and sulfur active materials was selected. Results from the development of an in house built electrospinning apparatus and its use to form LIB electrodes will be presented as well as performance results for the current generation of the materials produced.